

1 CLAIMS:

2 1. A wet-friction, composite material suitable for use in  
3 applications selected from the class consisting of wet  
4 transmission couplings, automatic lockers, limited slip  
5 differentials, smart clutches, synchronizers, brakes and the  
6 like, comprising: a carbon or graphite fabric formed from a  
7 woven, continuous, untwisted filament yarn and impregnated with  
8 modified cyanate ester resin or oligomers which are subsequently  
9 cured.

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11 2. The composite material of Claim 1, in which the modified,  
12 cured cyanate ester resin weight in the fabric is at least about  
13 10% by weight of the cured resin based on the combined weight of  
14 fabric and cured resin.

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16 3. The composite material of Claim 1, in which the modified  
17 cyanate ester resin in the fabric is about 10% - 50% by weight of  
18 the cured resin based on the combined weight of fabric and cured  
19 resin.

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21 4. The composite material of Claim 1, in which the modified  
22 cyanate ester resin in the fabric is about 10% - 35% by weight of  
23 the cured resin based on the combined weight of fabric and cured  
24 resin.

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1 5. The composite material of Claim 1, in which the modified  
2 cyanate ester resin weight in the fabric is about 10% - 25% by  
3 weight of the cured resin based on the combined weight of fabric  
4 and cured resin.

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6 6. The composite material of Claim 1, in which the modified  
7 cyanate ester resin in the fabric is about 10% - 18% by weight of  
8 the cured resin based on the combined weight of fabric and cured  
9 resin.

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11 7. The composite material of Claim 1, in which the modified  
12 cyanate ester resin in the fabric is about 12% - 17% by weight of  
13 the cured resin based on the combined weight of fabric and cured  
14 resin.

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16 8. The composite material of Claim 1, in which the modified  
17 cyanate ester resin in the fabric is about 40% - 50% by weight of  
18 the cured resin based on the combined weight of fabric and cured  
19 resin.

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21 9. The composite material of Claim 1, provided as a supplied  
22 product including an adhesive coating for applying to a metal  
23 surface, an adhesive film for application to a metal surface, or  
24 a cured fabric without an adhesive coating.

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1 10. The composite material of Claim 1, in which the fabric is  
2 formed as a continuous spiral, cut to size and bonded to the  
3 transmission in one piece.

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6 11. The composite material of Claim 1, in which the fabric  
7 material is selected from the class consisting of carbon,  
8 graphite, ceramics, boron, aramid fiber, glass, quartz, silica,  
9 and mixtures thereof.

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11 12. The composite material of Claim 1, in which the fabric weave  
12 is a plain weave.

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14 13. The composite material of Claim 1, in which the fabric weave  
15 includes: braided, 5 and 8 harness satin, basket, twill and,  
16 crowfoot satin.

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1 14. The composite material of Claim 1, formed from a prepreg in  
2 which the modified cyanate ester resin or oligomer is selected  
3 from the class consisting of: polycyanate ester modified with  
4 silicone elastomer, polycyanate ester modified with epoxy resin,  
5 polycyanate ester modified with polyetherimide, polycyanate ester  
6 modified with polyphenoxy resin, polycyanate ester modified with  
7 polysulfone or polyether sulfone resins, polycyanate ester  
8 modified with polyimide resins, polycyanate ester modified with  
9 polycarbonate resins, polycyanate ester modified with diglycidyl  
10 ether of novolac resins, and polycyanate ester modified with  
11 cresol novolac resins.

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13 15. A wet friction material for transmission couplings  
14 comprising a modified cyanate ester cured fabric formed from a  
15 braided fabric from continuous, untwisted filament yarn.

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17 16. The transmission coupling of Claim 15, in which the modified  
18 cyanate ester resin content in the fabric as cured is about  
19 10% - 18% by weight of the cured resin based on the combined  
20 weight of fabric and cured resin.

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22 17. The transmission coupling of Claim 12, in which the modified  
23 cyanate ester resin content in the fabric as cured is about  
24 12% - 17% by weight of the cured resin based on the combined  
25 weight of fabric and cured resin.

1 18. The composite material of Claim 1, comprising a yarn end  
2 count of 1,000 - 24,000 continuous filaments.  
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4 19. The composite material of Claim 1, comprising a yarn end  
5 count of about 3,000 - 12000 continuous filaments.  
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7 20. The composite material of Claim 1, comprising a cured  
8 material thickness of about 0.015 - 0.080 inches.  
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10 21. The composite material of Claim 1, comprising a cured  
11 material thickness of about 0.024 - 0.028 inches.  
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13 22. The composite material of Claim 1, comprising a cured  
14 material thickness of about 0.015 - 0.080 inches and an end count  
15 of about 3,000 - 12,000 continuous filaments.  
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17 23. The composite material of Claim 1, comprising a cured  
18 material thickness of about 0.024 - 0.028 inches, and an end  
19 count of about 6,000 - 12,000 continuous filaments.  
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21 24. The composite material of Claim 1, in which the modified,  
22 cyanate ester resin or oligomer is cured.  
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1 25. The composite material of Claim 1, comprising at least two  
2 layers of material adhesively bonded together.

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4 26. A method of forming a composite suitable for use as a wet  
5 friction coupling in applications selected from the class  
6 consisting of transmission couplings, automatic lockers, limited  
7 slip differentials, smart clutches, synchronizers, brakes and the  
8 like, comprising impregnating a plain woven fabric with a  
9 modified cyanate ester oligomer, the fabric being formed from a  
10 continuous, untwisted carbon filament yarn having an end count of  
11 about 3,000 - 12,000, the modified cyanate ester resin or  
12 oligomer as cured in the fabric being about 10% - 50% based on  
13 the weight of the fabric and cured resin, and the composite  
14 thickness being about 0.015 - 0.080 inches.